

Claims

- 1 1. A method of determining an input function for each of a plurality of clocked state
2 holding elements, said method comprising the steps of:
 - 3 a. determining, for each element, a first Boolean function corresponding to
4 variables forming an input to that element;
 - 5 b. determining a common gating function for the plurality of elements; and
 - 6 c. determining, for each element, a second Boolean function based on the first
7 Boolean function and the common gating function, each said second Boolean
8 function being determined such that it provides the same result as the
9 respective first Boolean function when the common gating function has a
10 value of 1, wherein each second Boolean function forms an input function for
11 the respective element.
- 1 2. The method according to claim 1 further comprising the step of selectively replacing
2 each said first Boolean function with its respective second Boolean function.
- 1 3. The method according to claim 2 wherein said step of selectively replacing is
2 dependent upon a comparison of each first and respective second Boolean function
3 to determine which is the most efficient function.
- 1 4. The method according to claim 4 wherein the most efficient function is the one that
2 can be implemented with a smaller number of implementation in terms of logical
3 gates.
- 1 5. The method according to claim 1 wherein the second Boolean function is created by
2 applying an algorithm to the first Boolean function.
- 1 6. The method of according to claim 5 wherein the algorithm creates a Karnaugh map.
- 1 7. The method according to claim 1, wherein the elements have at least one common
2 input and the gating function is determined by the steps of

3 a. determining, for each element, the conditions under which that element will
4 hold its current value based only on the common inputs ; and

5 b. combining, for each element, the determined conditions to form the gating
6 function for that element.

1 8. The method according to claim 7 wherein the Boolean function for each element
2 determines the conditions under which the element will hold its current value.

1 9. The method of claim 1 wherein the recited steps are carried out by computer
2 software.

1 10. An apparatus for determining an input function for each of a plurality of clocked
2 state holding elements, comprising:

3 a. means for determining, for each element, a first Boolean function
4 corresponding to variables forming an input to that element;

5 b. means for determining a common gating function for each of the plurality of
6 elements; and

7 c. means for determining, for each element, a second Boolean function based on
8 the first Boolean function and the common gating function, each said second
9 Boolean function being determined such that it provides the same result as
10 the respective first Boolean function when the common gating function has a
11 value of 1, wherein each second Boolean function forms an input function for
12 the respective element.

1 11. The apparatus according to claim 10 further comprising means for selectively
2 replacing each first Boolean function with its respective second Boolean function.

1 12. The apparatus according to claim 11 further including means for comparing each
2 first Boolean function to its respective second Boolean function to determine which
3 is the more efficient function and providing an output and wherein the means for
4 selectively replacing is dependent upon this output.

1 13. The apparatus according to claim 12 wherein the most efficient function is the one
2 that can be implemented with the smallest gating structure.

1 14. The apparatus according to claim 10, wherein the elements have at least one
2 common input and the gating function is determined by:

3 a. means for determining, for each element, the conditions under which the
4 element will hold its current value based only on the common inputs ; and
5 b. means for combining, for each element, the conditions to form the gating
6 function for that element.

1 15. A computer system comprising apparatus for determining a gating function for input
2 to one of a plurality of clocked state holding elements, said apparatus comprising:

3 a. means for determining, for each element, a first Boolean function
4 corresponding to variables forming an input to that element;
5 b. means for determining a gating function for each of the plurality of elements;
6 and
7 c. means for determining, for each element, a second Boolean function which
8 provides the same result as the first Boolean function when the gating
9 function has a value of 1.